Impact of foreign ownership on the firm-level stock return volatility in emerging countries: Evidence from Vietnam

Linh Hai Nguyen

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Attestation of authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent had been submitted for the award of any other degree or diploma of a university other institution of higher learning,

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Abstract

This study investigates the impact of foreign institutional ownership on firm-level stock return volatility in Vietnam, using a panel data of 298 firms listed on the Vietnam stock market for the period from 2007 to 2014. Vietnam is known as the third largest recipient that received investments from foreign investors in 2004 (Hafiz & Giroud, 2004). In addition, the change from a planned economy to a market economy has successfully increased the attraction of foreign investment in Vietnam. It is argued that ownership by foreign investors increases return volatility in emerging countries that significantly cause a downtrend in market returns or even financial crises (Stiglitz, 1999, 2000). Existing empirical evidence, however, is mixed. Bae et al. (2004) show that foreign investors reduce stock return volatility while Li et al. (2001) document an opposite effect. Empirical findings of this study suggest that foreign ownership decreases firm-level stock return volatility in Vietnam's stock markets. Furthermore, I document a reduction in volatility between foreign shareholding and stock return volatility during the global financial crisis, suggesting the important role that foreign ownership plays in stabilizing stock return volatility in the Vietnam stock market.

I. Introduction

It is believed that stock market volatility plays a significant role in supporting the growth and stability of the economy (Chari and Henry, 2004). The Great Depression of the 1930s is one the most typical examples of the effect of a stock market crash. The share price of the United States stock market fell down 89% on September 1929 preceding a deep and long economic recession. In addition, the stock market indirectly affects the economy through assets and investments. For example, if the value of investments goes down during a stock market recession, this will reduce the money for consumption that also affects the whole economy. Regarding this phenomenon, Singh (1997) shows that the stability of a stock market positively affects the growth of an economy.

Return volatility of equity markets refers to the fluctuation, uncertainty and risk of stock returns that change dramatically over a short period. These uncertainties are affected by factors such as domestic investors and government policy (Li et al. 2011). In addition, foreign ownership is an important factor that has a strong effect on performance of the stock markets' return volatility. On the one hand, foreign investors are good for equity markets in emerging countries. Portfolio flows from foreign investors have a strong positive correlation with expected returns in the countries in which they invest (Tesar & Werner, 1994; Bohn & Tesar, 1996; Brennan & Cao, 1997). Therefore, if foreign investors "come and go quickly," the additional volatility in these emerging countries leads to significant uptrends and downtrends in market returns and could even lead to a financial crisis. Bekaert & Harvey (2000) also show that the presence of foreign speculators in emerging equity markets reduces the cost of capital, decreases volatility in the markets and shares the risk between foreign and domestic investors. On the other hand, Stiglitz (1999, 2000) argues that foreign equity flows increase the risk in domestic and international markets, especially in the case of developing countries. Therefore, foreign speculation in the short-term also destabilizes and increases the domestic stock market's risk (Bae et al. 2004).

Any policies relating to the stock market development are important decisions for an economy, especially the liberalization, which is the opening of domestic stock markets to foreign investors. Since the 2000s, emerging markets have been affected by the presence of

foreign capital as a result of economic globalization and liberalization. International investments from western countries such as the United States, the United Kingdom and Germany account for a large proportion of stock markets in developing countries and are considered the main sources of economic growth during this time. However, the evidence on whether foreign capital strengthens or weakens local stock markets is mixed.

On the one hand, proponents of foreign capital flows argue the following. First, the attention of foreign investors into developing markets not only provides a good source of capital but also brings advanced managerial skills, the tools to make corporate governance better, improved transparency and human resource training (Stiglitz, 2000; Li et al. 2011). Second, foreign capital is an alternative way of financing in emerging markets and the risk in local stock markets is shared by foreign ownership (Bekaert & Harvey, 1997; Kim & Singal, 2000). Third, the introduction of foreign capital reduces the risk exposure of listed firms in developing countries. Foreign ownership, especially large foreign ownership, demands high information quality and greater transparency, and less risky companies in domestic stock markets stabilize the return volatility (Li et al. 2011; Chari et al. 2010).

On the other hand, the challengers of foreign capital flows argue that the capital from international investors brings global risk to the domestic stock market and leads to vulnerability of the local market, especially for premature financial markets and regulatory bodies that emerging countries have (Stinglitz, 1999, 2000). Empirical studies show that governments in developing markets after five years of stock market liberalization have to resurrect their economies with high financial costs and expose the domestic banks to excessively risky lending (Stinglitz, 2000). Also, the foreign capital's speculative short-term behavior destabilizes the local domestic stock market and increases its risk to global markets (Bae et al. 2004; Stinglitz, 1999, 2000).

Based on the discussed above arguments, the impact of foreign ownership on stock return volatility is of great importance for emerging markets. Researchers studying this issue empirically provide mixed results. Bekaert & Harvey (1997) show no relationship between foreign ownership and stock market return volatility, while Li et al. (2011) document a negative relationship, and Bae et al. (2004) document a positive relationship. Therefore,

further investigation is primarily needed to clarify the crucial role of foreign ownership in the return volatility of developing countries.

The Vietnam stock market was established in 2000 and has developed significantly since 2006 in terms of the number of listed firms and market value. From four listed companies in 2000, there are currently more than 900 listed companies in the two official stock exchanges: The Hanoi and Ho Chi Minh stock exchanges. Even though banks are the main sources of financing for companies in Vietnam, foreign investment is considered as the best alternative source of financing. However, the progress of this development quickly gets some serious problems. One of the biggest recessions in the Vietnam stock market was the effect of the global financial crisis. Thanh (2008) shows that foreign direct investment dropped significantly and the growth rate of exports decreased in September 2008 compared to the previous year. In addition, economic growth rate was less than 6% compared to the figure in 2008 and inflation was in a high range between 13 and 14 percent in 2009 (Thanh, 2008)

Several existing studies examine the effect of foreign investors on return volatility in Korea and the Philippines (Li et al. 2011). However, this investigation has not been done in Vietnam. In particular, this study extends some previous research by studying the Vietnam stock market because of three reasons. First, Vietnam accessed the WTO in 2007 that opened a new securities market for foreign investors. Vietnam was also the third largest recipient of investment among developing countries from foreign investors in 2004 (Hafiz & Giroud, 2004). Second, Vietnam is transforming from a central economy, which employs non-transparent regulation, an inadequate financial system and a shortage of skilled management, to a market-oriented model. Third, the Vietnam government has affirmed the importance of foreign investment in developing not only the stock market but also the economy and promised to provide more opportunities for foreigners to invest in Vietnam. For instance, foreign investors have a chance to own a ratio of securities up to 49% or even to 100% if they fulfil the requirements of the government.

The main contribution of this study is to provide new evidence on the effect of foreign ownership on return volatility through firm-level stock return volatility. Our study sheds additional light on these issues using a sample of 298 firms from 2007 to 2014 in the Vietnam

stock markets to answer the research question: *"How does foreign ownership affect the firm-level stock return volatility of Vietnam stock markets?"*

For this study the main dependent variable is foreign ownership and the control variables are stock price, firm size, leverage ratio, turnover ratio, market-to-book and dividend yield. The data are downloaded from DataStream and Osiris databases and collected manually from the Hanoi and Ho Chi Minh Stock Exchanges. The study analyses the relationship between foreign ownership and firm-level stock return volatility by applying an OLS regression with clustered standard errors by firm (Petersen, 2009) to the panel data. Also the potential endogeneity issue is investigated by employing (1) a fixed-effects regression model, (2) instrumental variables regression, which uses 'original ultimate controlling owner' and 'pyramid-controlled layer' as primary instruments for regression model, and (3) the first-difference regression model, which utilizes the differences in independent variables (foreign ownership) and control variables.

The main findings of this study regarding the effect of foreign ownership on firm-level stock return volatility are as follows. Firstly, the empirical results show that foreign equity ownership decreases firm-level stock return volatility; this result holds after controlling for firm characteristics and correcting for endogeneity problems. Regression coefficients show that a one standard deviation increase in foreign ownership leads to a decrease of 56.23% in stock return volatility in a Vietnamese firm. Also findings suggest that foreign investors prefer local Vietnamese firms with low leverage ratios, high liquidity and high market-to-book ratios. Secondly, the reduction of volatility is driven by large foreign investors that hold 5% or more of the shares that are issued by Vietnamese firms. This evidence suggests that large foreign investors, which not only have strong financial resources and impressive technology but also invest long-term and hold more strategic portfolios, play significant role compared to small foreign investors (portfolio investors) in explaining the stock return volatility. Finally, empirical results indicate that foreign ownership reduces firm-level stock return volatility in the global financial crisis (2007 and 2008), suggesting the important role of foreign ownership in stabilizing stock return volatility in the Vietnam stock market.

This paper is structured as follows. Section II provides a background and literature review; section III discusses the hypotheses; section IV displays the research methodology, and the data and descriptive statistics are presented in section V. Next, section VI provides the empirical result. Finally, section VII and VIII display endogeneity and conclusion, respectively.

II. Background

1. Foreign Equity Flows in Vietnam

Vietnam started a new policy known as "Doi Moi" (renovation), which is a socialist-oriented market economy, to attract more foreign investment flows in 1986. However, the progress towards implanting this plan did not occur until negotiation on the WTO in 1995. The changing from a planned economy to a market economy has led Vietnam to overcome many challenging obstacles such as an inadequate infrastructure, non-transparent policies and regulations that are not upheld. Fortunately, government policies were regulated to adapt to the new market with the Unified Investment Law introduced in 2006 that encourages the combination of domestic and foreign investment. These policy changes, along with Vietnam officially joining the WTO, have successfully increased the attraction of foreign direct investment in Vietnam. Besides, according to the statistical figures from the Government Statistical Office of Vietnam (GSO, 2011), capital flows from foreign direct investors (FDI) were recorded the highest amount of US$ 71.7 billion in 2008, which is almost three times the FDI in 2007.

2. Literature Review

Stiglitz (1999, 2000) suggests that premature emerging market liberalization, which happens without the support of the appropriate systems and regulatory structure, increases the risk for these markets and makes developing markets suffer financial crises. In addition, when developing countries open their markets to attract capital from overseas, foreign inflows expose these markets to international risk and lead to vulnerability of the domestic markets. The emerging stock markets are also destabilized by the speculative short-term behaviour of foreign ownerships (Stiglitz, 1999, 2000; Bae et al. 2004).

Bae et al. (2004) investigated how investibility of stocks owned by foreign investors affects stock market return. Their research is motivated by Sachs et al. (1996) who explain that if large outflows of investors happens simultaneously, it causes an exposure to the last mood of Wall Street traders. Adding to this train of thought, Edison & Warnock (2002) also reveal that investibility measures are related to capital control measures. Bae et al. (2004)

recognize that foreign ownership has to deal with many obstacles such as the limitation of banking, utility and energy areas or the distinct classes of shares (for example, A-shares for locals and B-shares for foreigners in some emerging countries). That, therefore, affects the behavior of foreign investors when they pick stocks that are "investibility" stocks (the maximum permissible proportion of foreign holdings). A cross-sectional model is used in the article of Bae et al. (2004) to examine the relationship between the investibility measure and large foreign ownerships at firm level. A sample of monthly data such as stock prices, dividends or trading volumes of 33 countries from January 1989 to September 2000 is used in the study. Three investibility groups, for example highly investible, partially investible and non-investible, are created (Bae et al. 2004). The results indicate that the changes in the degree of investibility of the stock follow the same trend as stock return volatility, meaning when investibility of an individual stock increases, the return volatility also increases, at different degrees.

Contrary to the positive relationship between foreign investment and return volatility (Bae et al. 2004), Li et al. (2011) hypothesize that stock return volatility is negatively related to large foreign ownership (LFO) who hold 5% or more of the issued shares in a company. In other words, Li et al. (2011) suggest that stock that have large foreign shareholders have lower stock return volatility. In addition, Stiglitz (1999, 2000) opens a new idea for the research of Li et al. (2011) when Stiglitz (1999), (2000) shows that the actual effect on large foreign ownerships, directly related to substantial shareholders, is overshadowed by the financial media. From this point, Li et al. (2011) provides an additional study focusing on the relationship between actual large foreign investors and return volatility. The authors recognize that decisions made by large foreign ownerships are affected by cross-border investment risks. Therefore, foreign investors will target firms with stronger backgrounds and lower volatility. The sample originally consists of the most liquid firms with size and trading turnover data, which are available in the S&P Emerging Market database in 31 emerging markets for 2002 and 2006. In the study of Li et al. (2011), after investigating for the dependent variable, the monthly volatility reduces by 4.47% if LFO increases 5% (Li et al. 2011). However, one limitation of this study is that the definition for LFO, which is foreign investors who each own 5% or more of the issued stocks, is not clear enough. The authors do not have a direct assessment of how large foreign investors are. Another stream

of research with the same conclusion with Li et al. (2011), which is foreign ownership stabilize the stock return volatility, comes from Umutlu et al. (2010). They show that after opening the market in emerging countries, the aggregated total volatility under individual stock that is invested by foreign investors has a negative movement. Related research by Hsu (2013) reveals that Taiwan markets experienced a negative relationship between foreign ownership and stock return volatility. Hsu (2013) primarily focuses on investigating this relationship during the global financial crisis and after, from 2007 to 2012. The author argues that the previous literature that examine the effect of foreign ownership on stock return volatility omits the financial crisis time. Furthermore, Hsu (2013) focuses only on the stocks that are the most-favoured and least-favoured by foreign investors, which are not the entirety of Taiwan stock market data. Using GARCH-extreme value theory-copula methodology, the author indicates that the least-favoured foreign group has higher 1% VaRs than the most-favored foreign group. Therefore, foreign ownership did not destabilize the domestic stock market during the global financial crisis.

The presence of foreign investors (particularly large foreign investors) in emerging stock markets not only improves the firm's valuation and operating performance but also reduces the capital expenditure and risk of exposure of listed firms (Mitton, 2006; Ferreira & Matos, 2008). Ferreira & Matos (2008) show that when foreign institutions become a part of developing stock markets, they enhance the value of shares in these countries. Furthermore, after including the potential endogeneity problem tests, they document that foreign institutions support the performance of operating systems and cut down the cost of capital. Continuing this train of thought, Ferreira and Matos (2008) highlight the important role of foreign institutions in emerging stock markets. Their results show no evidence for a positive effect from ownership by foreign investors on risk controls and better operating performance. The main motivation for Ferreira & Matos (2008) comes from Gillan & Starks (2003) when they hypothesize that large shareholder institutions offer the monitoring support for increasing firm management. Having the same argument that foreign ownership supports performance in emerging countries, Mitton (2006) shows that stock companies which are open to foreign investors have higher growth, lower risk and greater profitability. In this research, Mitton (2006) investigates 1,141 firms from 28 countries by focusing on five measures of performance: growth, investment, profitability, efficiency and leverage. The

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author also shed a light to some previous studies by using firm-level measures of liberalization to foreign investors. Mitton (2006) provides a comprehensive study by addressing three limitations of previous studies. First, the author avoids picking the liberalization dates by using data from the International Finance Corporation that specifies dates of investable stocks. Second, the economic reform problems are eliminated by using firm-level dating of investibility. The main reason for this improvement is that the specific openness dates to foreign investors are different in each company, even if they are in the same country. Third, because of using a firm-level analysis, Mitton (2006) addresses the issue of causality by including firm-fixed effects, and firm-level controls for different measurement factors. The empirical results indicate that the increased presence of foreign investors pushes the annual growth rates up to 2.3 percentage points, 2.2 percentage points for levels of investment, 2.4 percentage points for profitability ratios, 9.9 percentage points for levels of efficiency and decreases leverage ratio by 2.9 percentage points. In conclusion, Ferreira & Matos (2008) and Mitton (2006) show that emerging stock markets improve risk controls, increase operating performance and reduce the risk exposure of stock firms after the equity markets allow an openness of domestic stock market to foreign investors.

The above studies provide an aggregated view from many developing countries, while the article of Chen et al. (2012) focuses on one country, China, the biggest market in Asia. This study hypothesizes that foreign institutional ownership increases the volatility of firm-level stock returns after controlling for firm size, turnover and leverage. Also, it is predicted that a weak governance plays a significant role in attenuating the volatility reduction effect of foreign ownership. The results indicate that the return volatility increases 65.76% following a one standard deviation increase in foreign total ownership. Sharing the same outcome, the study of French and Vishawakarma (2013) shows that after a period of two weeks trading if the flows from foreign investors increase randomly, the volatility in return also increase significantly in the Philippines.

Also, other authors such as Bekaert & Harvey (1997) and Kim & Singal (2000) document no impact of foreign ownership on stock return volatility. Kim & Singal (2000) study a monthly return index sample of 18 emerging stock markets from the International Finance Corporation (IFC) based on the Emerging Markets DataBase. In this research, Kim

& Singal (2000) treat the volatility as a normally distributed variable and use ordinary sign tests and binomial tests to investigate changes in volatility. The empirical result from the study of Kim & Singal (2000) shows that in the first two years after developing countries open for foreign investors, the volatility levels are not much different from those before the opening.

III. Hypothesis

1. Hypothesis 1: Foreign ownership and firm-level stock return volatility.

Market liberalization plays an important role in the policy of an emerging economy, which gives more opportunities for foreign investors in contacting with local markets. However, there is no consensus on whether foreign cash flows bring benefits to the developing markets or that they worsen their economy by inputting unexpected volatilities. In case of Vietnam stock markets, the development has grown rapidly since early 2000s. Therefore, the effect of foreign ownership on stock markets becomes an important issue to investigate after the openness of Vietnamese government. Dealing with these problems, the existing literature shows two different views. On one hand, Bea et al. (2004) investigate the behavior of foreign investors when these investors face many obstacles in emerging countries and find foreign investors focused only on investibility stocks (the maximum permissible proportion of foreign holdings), which reflects the regulatory restrictions on the capital of foreign investors. The authors recognize that foreign portfolio capital destabilizes local stock markets due to the higher volatility of frequent trading as investable stocks become more exposed to world market risk. On the other hand, Umutlu et al. (2010) show that previous research just assumes financial liberalization at a single point, therefore the empirical results caused erroneous results. Therefore, Umutlu et al. (2010) investigate the relationship between foreign ownership and stock return volatility by considering the time-varying nature of liberalization. Considering financial liberalization as a process, Umutlu et al. (2010) conclude that foreign ownership decreases the stock return volatility, even after controlling for variables such as crisis effects, country, liquidity and firm size. Therefore, I expect:

H_0= *Foreign ownership increases firm-level stock return volatility*

H_1= *Foreign ownership decreases firm-level stock return volatility*

2. Hypothesis 2: Large foreign ownership and firm-level stock return volatility

Another possible explanation for the changing of firm-level stock return volatility is the behavior of large foreign investors, i.e. strategic investors. First, Li et al. (2011) study the benefits of large foreign shareholders who hold 5% or more of the issued shares in a company in 31 emerging stock markets. They document that large foreign ownership plays a stabilizing role in emerging markets, meaning that the relationship between large foreign ownership and volatility is negative. The main reason for picking large foreign ownership as a core factor in the research of Li et al. (2011) is because the authors recognize some limitations from previous studies. Previous studies do not differentiate between short-term and long-term strategic investors to emphasize the importance of the type of investors. Therefore, Li et al. (2011) construct the actual ownership pattern of large foreign ownership, which is specified by any foreign investors who hold 5% or more of the issued shares in a company, to study the impact of these investors on firm-level stock return volatility. Li et al. (2011) argue that large foreign investors have more knowledge and pursue long-term strategic goals and, therefore, presence of large foreign investors should reduce stock return volatility. This study extends Li et al. (2011) by employing the actual percentage of large ownership for a full sample of Vietnamese listed firms from 2007 to 2014. Foreign investors in the Vietnam stock market have a chance to own up to 49% or even to 100% of equity; therefore, they may affect the equity market significantly in the case of recession. From these theoretical arguments above, I expect:

H_0= *Large foreign ownership increases firm-level stock return volatility*
H_1= *Large foreign ownership decreases firm-level stock return volatility*

3. Hypothesis 3: Small foreign ownership and firm-level stock return volatility

Following the argument which is the large foreign ownership and foreign ownership may decrease the stock return volatility in the hypothesis 1 and 2. This study also investigates the relationship between small foreign ownership (less than 5% ownership of the issued shares in a company) and firm-level stock return volatility. Considering the literature above, this is the first study that investigate the ownership pattern of small foreign shareholders in the Vietnam stock market instead of relying on foreign investment limits, the proportion

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invested by foreign ownership is limited, and liberalization opening dates as in previous studies. In this study I argue that small foreign shareholders are rarely committed to their investments, and their small ownerships provide a strong incentive to increase volatility. While this study does not have direct evidence on how small foreign ownership affects local firms' return volatility, some indirect support for the argument above is possible. Stulz (1999) shows that foreign investors with large and direct investment are more stable shareholders; therefore, small foreign ownership may be more sensitive to the market. In addition, small portfolio investors do not demand greater transparency and good accountability of management in a company, all of which can result in higher return volatility or no effect. Therefore, I expect:

H_0= *Small foreign ownership has positive relationship with firm-level stock return volatility*
H_1= *Small foreign ownership has no relationship with firm-level stock return volatility*

4. Hypothesis 4: Foreign ownership and firm-level stock return volatility during the global financial crisis.

In the case of the global financial crisis, it is asserted that when the stock market is affected significantly, foreign ownership in the local stock market would have to adjust their strategy for surviving purposes. For example, foreign investors in Vietnam stock markets who hold a significant proportion of shares could restructure their portfolio by reducing or withdrawing funds and capital out of the local market (Thanh, 2008)**.** These activities could trigger a considerable stock return volatility and put severe pressure on both government policy and domestic investor strategy to prevent the collapse of the stock market. Furthermore, Vietnam stock markets are considered as a small open economy that is much more vulnerable in the case of small shock in the global financial crisis. Stiglitz (1999), (2000) also suggests that the liberalization of the premature financial market receives excessive risk and is vulnerable to financial crises without the support of appropriate development and regulatory structures. On the contrary, Choe, Kho, & Stulz (2005) argue that opening the investor base of a firm in the Korean stock market created a risk-sharing experience between foreign and domestic investors, and ultimately, reduced stock return volatility. Therefore, the authors show that foreign investors stabilized the stock return volatility before and during the 1997 Asian financial crisis. Another stream of research with confirmation of the negative relationship between foreign ownership and volatility comes

from Hsu (2013). This author concludes that the foreign investor did not destabilize the domestic stock market during, and in the aftermath of, the financial crisis during the five years from 2007 to 2012. Therefore, I expect:

H_0= *Foreign ownership increases firm-level stock return volatility during the global financial crisis*

H_1= *Foreign ownership decreases firm-level stock return volatility during the global financial crisis*

IV. Research methodology

This section discusses the methodology which is employed to explain the impact of foreign ownership on firm-level stock return volatility. First, I construct the main regression model similar to Li et al. (2011) and Chen et al. (2013) in the research methodology part. In this model, I include an independent variable, which is foreign ownership, explanatory variables and control variables such as firm size, leverage ratio, turnover ratio, market-to-book ratio and dividend yield. The first hypothesis, which is the relationship between foreign ownership and stock return volatility, is examined an OLS regression with clustered standard errors by firm (Petersen, 2009). What is more, large foreign ownership is used as an explanatory variable in the regression model to investigate the second hypothesis. The third hypothesis is investigated by using the same regression model which uses foreign ownership as an explanatory variable; however, I only use 2007 and 2008 as main period of time for the global financial crisis in the model.

Following the Hypothesis section, the research methodology attempts to investigate these hypotheses to address the relationship between foreign ownership and firm-level stock return volatility by studying a sample of 298 firms listed on the Vietnam stock market for the period from 2007 to 2014. The data in this study cover a considerable time frame, including the global financial crisis, given the progressive development of the stock market in Vietnam.

A panel data, which is combined cross-sectional data with time series, is used in this study. The panel data allows researchers to control for national policies, business characteristics across companies and international agreements. According to Baltagi (2005), panel data increases informativeness of data and reduces collinearity among variables that push up a biased model. To investigate the effect of foreign ownership on firm-level stock return volatility, this research utilizes an OLS regression with clustered standard errors by firm (Petersen, 2009) to the panel data, which is similar to the model employed by Chen et al. (2013):

$$\text{Volatility}_{i,t} = c + \beta_1 \text{FO}_{i,t} + \beta_2 \text{Control}_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where $\text{Volatility}_{i,t}$ is the annual volatility. $\text{FO}_{i,t}$ is the proportion of shares held by foreign ownership at the end of the year and $\text{Control}_{i,t}$ are controlling variables.

1.   Dependent variable

As the main purpose of the paper is to investigate whether increase in foreign ownership in firms has any impact on stock price volatility, the construction of stock price volatility variable, the dependent variable in the regression analysis, is notably important. Volatility measure is constructed similar to Chen et al. (2013) and consistent with Bae et al. (2004) and Li et al. (2011). Using weekly stock prices in the Vietnam stock market for the period from 2009 to 2014, I calculate weekly returns as the difference in natural logarithm of the stock prices adjusted for dividends. Annual volatilities of firms are constructed as follows.

$$SD_i = \sqrt{\frac{1}{n-1}\sum_1^n(return_{i,k} - mean_{i,t})^2} \quad (2)$$

where $return_{i,k}$ is the weekly return of stock i in week k, n is the number of trading days for stock i in a year, and $mean_{i,t}$ is the annual average rate of stock return in year t of firm i.

The second measurement of volatility used in this study is the logarithm of squared weekly returns which is constructed similar to Bae et al. (2004). Annual volatilities of firms are calculated as follows.

$$VL = \frac{1}{n}\sum_{t=1}^n \ln(return_{i,k})^2 \quad (3)$$

where $return_{i,k}$ is the weekly stock return, and n is the number of trading days for stock i in a year.

2.   Explanatory variables

The main explanatory variable is Foreign ownership (FO) that represents the proportion of total shareholdings by foreign investors on a particular firm's total number of shares. Large foreign ownership is defined as a holding larger than or equal to 5% of a firm's issued shares (Li et al. 2011), and small foreign ownership is defined as a holding smaller than 5% of a firm's issued shares.

3. Control variables

To investigate the effect of foreign ownership on firm-level stock return volatility, I considered several control variables such as size, turnover, leverage, market-to-book and dividend yield. These are the firm characteristics that affect the volatility of stock returns (Li et al. (2011); Xuan (2015)). Firm size is the logarithm of the market value at the end of the fiscal year. Bae et al. (2004) and Li et al. (2011) find a significant relationship between size of firm and return volatility. They show that larger firms have greater foreign investments and lower return volatility. Stock turnover is the annual average number of shares traded in a day divided by the number of shares outstanding during the year. This is an important factor to consider based on the result from Li et al. (2011) that reports a positive relationship between turnover and return volatility. The expected sign of the regression coefficient is positive. Leverage is the ratio of total liability to total assets at the end of the fiscal year, as evidenced by Li et al. (2011), and is another important factor that affects return volatility. I expect this ratio to have a positive relationship with the return volatility. Market-to-book presents the ratio that is calculated as the stock price divided by the book value per share of the company. Dividend yield is stock's dividend as a percentage of the stock price.

As with previous studies such as Li et al. (2011), this study faces a potential endogeneity problem. More specifically, the firm characteristics have effects on the foreign institution ownership's decision but whether this effect is significant enough to change the return volatility or not is still a question. To address the endogeneity concern this study models the return volatility relationship using the following approaches: (1) firm fixed effects regression; (2) instrumental variables (IV) regression and (3) first difference regression. The latter two methods are the same methods employed by Li et al. (2011) and Chen et al. (2013).

V. Data and descriptive statistics

1. Data

Raw data for foreign ownership and domestic ownership during the period from 2007 to 2014 was constructed using data from Osiris database (Bureau Van Dijk). Then, firm-level data such as firm size, stock turnover, leverage, stock price, market-to-book and dividend yield was collected from the DataStream and Osiris databases. I also obtained information on these data above manually using the websites of Ho Chi Minh and Hanoi stock exchanges. All data collected on a yearly basis and stock prices for estimating volatility measures were collected on a weekly basis.

First, I used data on DataStream of Thomson Reuters, which is a powerful tool that integrates economic research and strategy with cross asset analysis. Another reason I chose DataStream is that it focuses on emerging countries.

The data set relies on weekly data for stock price and yearly data for firm size, turnover, leverage, market-to-book and dividend yield in the Vietnam stock market from 2007 to 2014. One problem that appears in this study is that the data for 2007 and 2008 are not fully available in both DataStream and Osiris and were collected manually from the Hanoi and Ho Chi Minh stock exchanges websites. The number of firms is not consistent across different models due to the availability of some control variables. After checking for data availability, I ended up with a sample of 298 companies with data for each year for the period from 2007 to 2014.

To be more detailed, this study uses the "Time Series Request" tab in Excel to make a table to download data from DataStream. The following are explanations for the codes that were used to collect the data:

DY: The dividend yield expresses the dividend per share as a percentage of the share price. The underlying dividend is calculated according to the same principles as data type DPSC (Dividend per share, current rate) in that it is based on an anticipated annual dividend and excludes special or once-off dividends.

MV: Market value on DataStream is the share price multiplied by the number of ordinary shares on issue. The amount on issue is updated whenever new tranches of stock are issued or after a capital change.

P: Data type (P) represents the official closing price. This is the default data type for all equities.

NOSH: this is the total number of ordinary shares that represent the capital of the company.

VO: this shows the number of shares traded for a stock on a particular day.

NOSHFR: Foreign Held Shares %: The percentage of total shares on issue of holdings of 5% or more held by an institution domiciled in a country other than that of the issuer.

PTBV: Price to book value: The price-to-book ratio, or P/B ratio, is a financial ratio used to compare a company's current market price to its book value.

Finally, I also collected data from Osiris (Bureau Van Dijk), which is one the most powerful websites for financial information related to listed firms in the stock markets, by selecting the criteria such as location (Vietnam), listed firms and foreign ownership.

2. Descriptive statistics

Descriptive statistics for volatility, foreign ownership, and control variables such as size, leverage ratio, turnover ratio, dividend yield and market to book ratio fall into two classes: location statistics (mean, median), dispersion statistics (standard deviation). The mean is the simple arithmetic average of all values. In this study, the mean is represented by the symbol X and it is calculated as:

$$X = \sum \frac{x}{N} \qquad (4)$$

Where x represents the value of independent variables, $\sum$ represents summation over all observations in each variable, and N is the number of observations with non-missing values. In our panel regression model, N equals 298 observations and spreads during the eight years from 2007 to 2014. The median presents the value that has half of the ordered values below, and the rest are above, the median number.

In contrast to location statistics, dispersion statistics (standard deviation) provides information about the variability of 298 companies from 2007 to 2014. The standard deviation, defined as the square root of the variance, is used in this study. The formula for standard deviation is discussed in the previous section.

Following the explanation above, this study presents the time-series and cross-sectional regression model of each variable for all 298 companies in the Vietnam stock market in Table 1. The top row shows the name of the variables and the left column shows the location statistics (mean, median) and dispersion statistics (standard deviation, minimum and maximum).

INSERT TABLE 1 HERE

In Table 1, the average proportion of foreign ownership is 4%, of which 2.6% is large foreign ownership and 1.4% small foreign ownership. However, the maximum value of 86.65% foreign ownership in some companies indicates that some Vietnamese firms attract significant interest from foreign investors. The first volatility measure (VOSD), which is the standard deviation of monthly stock returns, has a mean value of 0.505 and a standard deviation of 0.18 while the second volatility measure (VOLN), which is the logarithm of square monthly returns, has a mean value of -5.51. Considering VOLN in Table 1, the maximum is 0 while the minimum is -8.211 indicating a significant variability in volatility of Vietnam's stock market. In addition, Table 1 also shows us the overview of firm characteristics of the Vietnam stock market. The average value of leverage ratio (LEV) of 3.09 indicates that stock companies in Vietnam have a lot of debt relative their assets. One of the reasons for this phenomenon is that Vietnam stock markets are still young and the companies in the market are trying to expand as much as possible. In addition, the trading turnover in Vietnam's stock market is relatively low, with an average of 1.2%. However, the average proportion of 1.08 by market-to-book value shows us that the stock price in the Vietnam stock market is slightly higher than its book value.

INSERT TABLE 2 HERE

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Table 2 presents the same information for description statistics in the Vietnam stock market; however, this table provides a closer look about the company with and without foreign ownership. At first glance, it can be seen that the average proportion of 0.53 by stock return volatility standard deviation in the companies without foreign ownership is higher than the figure of 0.461 in the companies with foreign ownership. In addition, the companies with foreign ownership tend to invest into the big companies, which is proved by the mean value of 13.134. Also, this figure is higher than the average value of 11.613 of the companies without foreign ownership.

INSERT TABLE 3 HERE

Table 3 presents the result of correlation coefficients amongst variables in this analysis. severe multicollinearity increases the variance of the coefficient estimates and makes the model change significantly. In general, the collinearity at 0.7 or greater would not be included in regression analysis due to multicollinearity. To do this test, I used the data analysis and correlation function in Excel to figure the correlation coefficient between dependent and independent variables. As shown in Table 3, the highest correlation coefficient is 0.88 between foreign ownership and large foreign ownership that I do not include in the regression model at the same time, and the lowest correlation coefficient is -0.28 between the standard deviation of monthly returns to proxy for volatility. Thus, all of the independent variables are free from severe multicollinearity, and the regression model will be unbiased and show a suitable result.

The following provides more details about the results from Table 3. First, it can be seen that two measures of volatility are negatively correlated with foreign ownership, which includes both large and small foreign ownership in the Vietnam stock markets. This result suggests that foreign ownership is associated with lower stock return volatility. In addition, firm-level stock return volatility is positively correlated with turnover ratio and market-to-book value and negatively correlated with firm size and leverage ratio. The correlation coefficient between foreign ownership and control variables such as firm size, leverage ratio, turnover ratio, dividend yield and market-to-book ratio in Table 3 also show relationship between the foreign ownershipand their investment in the Vietnam stock market. Both large

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and small foreign ownership is associated with companies with larger size and higher market-to-book value ratios. However, small foreign ownership is associated with firms with a lower leverage ratio that is consistent with the research of Dahlquist and Robertsson (2000), suggesting that foreign ownership has preferences for firm characteristics to avoid information asymmetry.

INSERT TABLE 4 HERE

Table 4 reports the t-test on the equality of means and non-parametric sample test between companies with foreign ownership and companies without foreign ownership of each control variables. The following results are consistent with the description statistics analysis in Table 3. The p-value in the t-test of VOSD and VOLN are 0.0000 and 0.0380, respectively. These p-values are lower than 5% which indicates that the study finds a statistically significant difference in the mean of the companies with foreign ownership and companies without foreign ownership. The mean value of the companies with foreign ownership is 0.461 which is lower than 0.513, which is the mean value of the companies without foreign ownership. The p-value of size, leverage ratio, dividend yield and the market-to-book ratio is also lower than 1%, which shows a statistically significant difference from each other. Interestingly, only the p-value of turnover ratio is greater than 10%, and I did not find a statistically significant difference in the means. In conclusion, Table 4 shows that firms with foreign ownership have lower volatility, larger size, more leveraged compared to firms without foreign ownership.

A non-parametric regression is also used to test the relationship between the companies with foreign ownership and companies without foreigner ownership on the equality of median. The p-value equals 0.0000 which is lower than 1%. This result indicates that there is a significantly difference between the companies with foreign ownership and the companies without foreign ownership in term of volatility, size, and dividend yield. In conclusion, the results from Tables 4 show that foreigner ownership tends to stabilize the firm-level volatility in the Vietnam stock market.

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VI. Empirical Results

1. Foreign ownership and firm-level stock return volatility

To test the first hypothesis whether foreign ownership has any effect on firm-level stock return volatility in the Vietnam stock market, the panel regression is estimated as in equation (1). Estimation results are reported in Table 5. Table 5 presents the results of an OLS regression with clustered standard errors by firm (Petersen, 2009) for a full sample which is foreign ownership in 298 listed firms in the Vietnam stock market and control variables such as size, leverage ratio, turnover ratio, dividend yield and market-to-book ratio.

INSERT TABLE 5 HERE

Table 5 reports the regression results of the relationship between foreign ownership and firm-level stock return volatility. Model (a) employs a standard deviation (SD) of monthly returns to proxy for volatility (VOSD) and model (b) employs logarithmic transformation of squared returns (VOLN). According to models (a) and (b) in Table 5, the regression coefficient estimators of foreign ownership (FO) are negatively significant at the 5% level, which indicates that a higher proportion of shares held by foreign aggregate ownership makes a lower risk of corresponding company stock returns. Therefore, foreign ownership plays a stabilizing role in Vietnam stock markets. The regression coefficient estimator of size shows a negative statistical significance at the 1% level (p-value = 0.0000) in the regression with both standard deviations of monthly returns and logarithmic transformation of squared returns as the dependent variable in the OLS regression with clustered standard errors by firm (Petersen, 2009). Overall, these results are consistent with expectations in the methodology section that is the relationship between foreign ownership and firm-level stock return volatility is negative.

1.1 Economic significance

These results from the panel regression model are also significant economically. For instance, model (a) shows that if the standard deviation increases by one, foreign ownership

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decreases firm-level stock return volatility in Vietnam firms by 1.24% (12.48*(-0.0010)), which is 30.7% of its mean (1.24/4.03).

In regards to control variables, the coefficients estimator of turnover is positively significant at the 1% level (p-value = 0.0000) for both volatility measures used. These results indicate that the risk of return will be higher if the turnover of Vietnamese stock companies is larger, which also confirms our expectations which is a positive relationship between turnover and return volatility in the methodology section and is consistent with Li et al. (2011). The coefficient estimator of leverage ratio is significantly negative in an OLS regression with clustered standard errors by firm (Petersen, 2009) with standard deviation (SD) as the dependent variable which suggests that the higher the leverage ratio of firms in Vietnam stock markets, the lower is the risk of return.

The consistently negative relationship of foreign ownership on firm-level stock return volatility is in line with the following two arguments. First, foreign ownership, especially foreign institution ownership, has a better long-term investment strategy and advantages in collecting information from domestic stock markets (Bohl and Brzeszczynski, 2006). In their research, Bohl and Brzeszczynski (2006) show that the institutional investors in Poland helped to stabilize rather than destabilize returns volatility, which is consistent with our expectation in the previous analysis, especially as Vietnam is also a developing country. Second, in Vietnam, foreign investors have the tendency to invest for the long-term due to the open form of Vietnamese government in regulation constraints; that is, foreign investors become the controlling party in the public company in the stock market. Therefore, with the presence of foreign investors trading activities will be more stable, as will stock return volatility.

2.   Large, small foreign ownership and firm-level stock return volatility

Thus far, I have shown how foreign ownership affects the firm-level stock return volatility in the Vietnam stock market. Next, I examine whether large and small foreign ownerships affected stock return volatility differently. Consistent with Li et al. (2011), I define large foreign ownership as an ownership holding 5% and greater of issued shares of a

Vietnam company. A small foreign ownership would be the ownership holding smaller than 5% of issued shares. After that, the ownership data is matched from the Osiris database with DataStream to identify the final set of large and small foreign ownership data. Hypothesis 2 suggests the negative relation in the hypothesis development section to be more pronounced for the firm-level stock return volatility from ownership with large and small foreign ownership.

INSERT TABLE 6 HERE

Table 6 reports the estimation results of stock return volatility on large foreign ownership, with the same control variables being volatility measured in hypothesis one such as size, leverage ratio, turnover ratio, dividend yield and market-to-book. The result shows the coefficients of large foreign ownership are negative and statistically significant in both regression models at the 5% level. Therefore, large foreign ownership is found to reduce the stock return volatility. This effect also gives a considerable view about the economic significance. For example, in the coefficient column of Table 6, which reports the results of the OLS regression with clustered standard errors by firm (Petersen, 2009) for eight years, the coefficient of large foreign ownership is -0.0008 (VOSD). This implies that if standard deviation increases by one, large foreign ownership reduces firm-level stock return volatility by 0.81% (-0.0008*10.17), if other factors remain constant.

In addition, I investigate the effect of small foreign ownership on stock return volatility to cover all types of foreign ownership. Table 7 shows the result. Our findings point out that small foreign ownership has an insignificant effect on stock return volatility. Overall, only the presence of large foreign ownership strongly decreases volatility in the Vietnam stock market. Overall, these results support Hypothesis 2 and 3: large foreign ownership decreases firm-level stock return volatility and small foreign ownership has no relationship with stock return volatility

INSERT TABLE 7 HERE

In regards to control variables, consistent with the expectations and previous research, stock return volatility is significantly lower in large, low-turnover firms. Furthermore, the control variables such as size, leverage ratio, turnover ratio, dividend yield and market-to-book do not alter the negative significance of the large foreign ownership variable.

3.   Foreign ownership and firm-level stock return volatility during the global financial crisis

To investigate the relation between foreign ownership and firm-level stock return volatility during the global financial crisis, I used the sample data from the Hanoi and Ho Chi Minh stock exchanges in 2007 and 2008. The sample data in this section only includes 223 listed firms due to the limited number of firms in the Vietnam stock market and unavailable data for the other control variables. Table 8 reports the regression results of our data estimation where VOSD and VOLN are dependent variables. It can be seen that foreign ownership has a negative effect on stock price volatility when p-value in both VOSD and VOLN variables is lower than the 10% criterion, which means that foreign ownership stabilizes the stock price volatility during a period of global financial crisis. These results, therefore suggest that policy makers in Vietnam, a small open economy, need to remove legal restrictions to attract capital flows from foreign investors. In addition, the negative relationship between foreign ownership and stock return volatility in the global financial crisis is a positive sign for the Vietnam stock market to be able to deal with any recession period in the future. Overall, the result in Table 8 is also consistent with the expectation and the research of Hsu (2013), supporting Hypothesis 4.

INSERT TABLE 8 HERE

VII. Endogeneity

As with other previous studies such as Li et al. (2011), Chen et al. (2013) and Bae et al. (2004), this study has to deal with a potential endogeneity problem: specifically, whether foreign investors reduces stock return volatility naturally or they consciously pick the less risky firms. To address the potential endogeneity issue, I use three methods: (1) firm fixed effect regression model, (2) IV regression and (3) first-difference regression model.

First, this study estimated the relationship between foreign ownership and firm-level stock return volatility by using firm fixed effects, which controls for firm-specific factors, such as size, leverage ratio, turnover ratio, market-to-book ratio and dividend yield, and reducing the potential omitted variables bias. Table 9 shows the regression results which include firm-level fixed effects. Model (a) employs standard deviation (SD) of monthly returns to proxy for volatility and model (b) employs logarithmic transformation of squared returns (VL). According to models (b) in Table 9, the regression coefficient estimators of foreign ownership (FO) is negatively significant at the 5% level, which indicates that a higher proportion of shares held by foreign aggregate ownership makes a lower risk of corresponding company stock returns. Therefore, foreign ownership plays a stabilizing role in Vietnam stock markets. However, the coefficient's figures in the fixed effects regression model which is -0.0008, is lower than the coefficient's figure of OLS regression model (-0.001). Interestingly, the coefficient's estimator of size and leverage ratio is insignificant at the 10% level (p-value = 0.29 and p-value=0.64, respectively) for both volatility measures used. Overall, although some significance is lost, the main results, the negative relationship between foreign ownership and firm-level stock return volatility, still hold suggesting that the findings are not driven by an omitted variables bias.

INSERT TABLE 9 HERE

Another source of endogeneity issues is simultaneity, i.e. volatility may influence the behavior and portfolio allocation of foreign investors, although the empirical results are minimized. For example, Kang & Stulz (1997) found that foreign ownership just invests in low unsystematic risk firms. Dahlquist & Robertsson (2001), on the other hand, suggest that stock return volatility is not significantly related to foreign investors' percentage ownership, after controlling for other firm characteristics. A solution to this type of endogeneity problem is to use an IV regression approach. Consistent with Li et al. (2011), instrumental variables are selected that need to be highly correlated with foreign ownership and uncorrelated with the dependent variable which is volatility. Following the method of Li et al. (2011), I choose 'original ultimate controlling owner' and 'pyramid-controlled layer' as the instruments which are collected from 298 listed firms' financial report. Original ultimate controlling owner distinguishes two types of listed firms in the Vietnam stock markets depending on how they were founded. Original ultimate controlling owner indicator is 1 if listed firms were founded by a family or individual, and 0 for privatized firms (Li et al. (2011)). The main reason for the correlation between this instrument and foreign ownership because foreign investors acquire stakes in emerging market companies mainly through the avenues of privatization of government-owned enterprises (Li et al. 2011). The pyramid-controlled layer presents how many ownerships connected to the listed firms that means I separate the firm form its ultimate controlling owner to trace down the actual number of owner investing in a particular company.

In Table 10, I report the results for the IV regression estimated using two-stage least squares. For the first stage regression of foreign ownership, reported in panel (a), I observe that the pyramid-controlled layer is negative and significant at the 1% level, while the original ultimate controlling ownership show the positive sign. The significant result of instruments variables show that these instruments appear to be highly correlated with foreign ownership and uncorrelated with firm-level stock return volatility. For the firm characteristics, turnover dividend yield, and market-to-book are negatively significant at the 1% level, i.e. lower dividend yield, riskier companies tend to have more foreign investors. I also find that the coefficient estimates of size and leverage ratio are insignificant. To sum up, foreign ownership investors may exhibit greater preference for different strategies that focus on low information asymmetry and high liquidity companies.

INSERT TABLE 10 HERE

In the panel (b), I report the results for the second stage regressions for standard deviation (SD) of monthly returns to proxy for volatility and logarithmic transformation of squared returns (VL). For both regressions I observe that foreign ownership remains a negative and statistically significant at least at 10% relationship with stock return volatility. In addition, using the instruments, original ultimate controlling owner and pyramid-controlled layer, does not affect the significance of other control variables such as turnover ratio, dividend yield and market-to-book. In summary, these results support the conclusion that higher foreign ownership helps to stabilize firm-level stock return volatility.

The third method to address the potential endogeneity problem to investigate the relationship between foreign ownership and volatility is conducting regression of the 1st-difference form. The independent variables now include the differences in explanatory and control variables. The dependent variable is the change of firm-level stock return volatility (standard deviation of weekly stock returns and logarithm of squared weekly returns). According to Chen et al. (2013) and Li et al. (2011), the first difference form specification of the regression model represents unobservable time-invariant firm attributes and are defining factors for both stock return volatility and foreign ownership. This method provides a reliable result to support the data set in the case of Vietnam stock markets. The empirical results are reported in Table 12. As shown in Table 12, the negative sign between foreign ownership and stock return volatility remains significant and the figure of p-value is slightly stronger compared with those in the second method. These results demonstrate that the increase or decrease of investment from the foreign investor into the Vietnam stock markets decreases or increases firm-level stock return volatility. This finding confirms the result as expected from the beginning of this study that the impact of foreign ownership on firm-level stock return volatility is negative.

INSERT TABLE 11 HERE

In summary, the estimation results from the first-difference regression indicate that after correcting for endogeneity problems, foreign ownership still exhibits a significantly negative relationship with stock return volatility, from which we can conclude that the documented empirical results in this study are unlikely to be due to potential endogeneity.

VIII.   Conclusion

As a result of liberalization, the opening of domestic stock markets to attract capital flows from foreign investors, and globalization, there are increasing concerns about the possible effect of foreign investments on stock return volatility. Understanding the role of foreign investors will support the local stock markets adjusting their policies and developing stable markets. Current theoretical and empirical research provides contradictory arguments and evidence on this issue. This study fills the gap in the literature by investigating the impact of foreign ownership on firm-level stock return volatility in the Vietnam stock market using a panel data set of 298 companies with firm characteristics and stock market data during 2007 - 2014.

This study documents a negative relationship between foreign ownership and firm-level stock return volatility, i.e. greater foreign ownership is associated with a reduction in stock return volatility. Using OLS and fixed effect estimators for a panel data regression model and correcting for the potential endogeneity issues, I find that foreign shareholders stabilize stock return volatility in Vietnam stock markets. The major reason for the negative relationship between the foreign ownership and firm-level stock return volatility seems to be supported by the fact that foreign investors in Vietnam stock market focus on long-term strategy and invest in the low information asymmetry and high liquidity firms. From that major reason, government of Vietnam allows foreign investors have a chance to own a ratio of securities up to 49% or even to 100% if they fulfil requirements to stabilize stock markets. The stabilizing effect of foreign investors shown in this research is also in line with the findings from previous studies in other emerging markets (Li et al. 2011, Chen et al. (2013).

This study also contributes an important result that is the stabilization role of foreign ownership on firm-level stock return volatility during the global financial crisis. Furthermore, there are some policy implications of the findings of this study for policy-makers in emerging countries. It provides evidence on an important role of foreign investors in stabilizing, rather than destabilizing, stock market volatility. Therefore, governments in developing countries should create more opportunities and reduce restrictions to attract greater foreign ownership to local markets.

Further investigation is needed to find the effect of foreign ownership on stock return volatility on a daily or intra-day basis, which would be more informative than the annual basis used in this study. In addition, discovering and improving additional methods to investigate potential endogeneity problems is necessary to examine whether the foreign ownership activities actually cause a decrease in volatility.

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X.   Appendix

Table 1 Descriptive statistics of variables

	VOSD	VOLN	FO	LFO	SFO	DO	MV	SIZE	LEV	TR	DY	MTB
Mean	0.51	-5.51	4.03	2.56	1.47	92.26	1354708	12.15	3.10	1.26	7.02	1.08
Median	0.49	-5.72	0.00	0.00	0.00	95.89	158801	11.96	1.85	0.55	5.88	0.88
Min	0.00	-8.21	0.00	0.00	0.00	9.24	1960	7.58	0.21	0.00	0.00	-1.56
Max	1.18	0.00	86.65	80.00	65.90	98.78	11418660	18.57	35.54	13.17	55.00	6.46
SD	0.18	1.21	12.48	10.17	5.97	12.21	5846327	1.77	6.76	1.78	6.25	0.82

Notes: This table reports the descriptive statistics of variables. The sample is from 2007 to 2014. VOSD and VOLN are the two measures of the stock return volatility; FO is foreign ownership; LFO is large foreign ownership; SFO is small foreign ownership; DO is domestic ownership; MV is the market value of the listed firms; Size is the firm size, which is calculated as the logarithms of the market value; LEV is leverage ratio, which is calculated by total liability divided by total asset; TR (Turnover) is the annual average number of shares traded divided by the number of shares outstanding in a day; DY is the dividend yield of listed firms; MTB is the market to book ratio, calculated as the stock price divided by the book value per share.; SD is standard deviation; Min is minimum; Max is maximum.

Table 2 Descriptive statistics of variables in companies with and without foreign ownership (FO)

Company without FO

	VOSD	VOLN	FO	SIZE	LEV	TR	DY	MTB
Mean	0.530	-7.055	0.000	11.613	2.734	1.247	7.534	1.032
Median	0.516	-6.943	0.000	11.534	1.726	0.515	6.425	0.865
Minimum	0.000	-11.513	0.000	7.581	0.212	0.000	0.000	-1.561
Maximum	1.181	-4.922	0.000	17.207	35.539	13.155	55.000	5.489
SD	0.183	1.058	0.000	1.472	3.195	1.764	6.702	0.724

Company with FO

	VOSD	VOLN	FO	SIZE	LEV	TR	DY	MTB
Mean	0.461	-7.158	12.326	13.134	3.202	1.244	6.164	1.172
Median	0.433	-7.107	2.440	13.077	2.093	0.587	4.930	0.922
Minimum	0.000	-11.513	0.44	8.912	0.790	0.002	0.000	0.106
Maximum	1.104	-4.909	86.650	18.568	28.577	13.175	36.230	6.460
SD	0.174	0.891	19.690	1.859	3.167	1.753	5.418	0.964

Notes: This table reports the descriptive statistics of variables in companies with and without foreign ownership. The sample is from 2007 to 2014. VOSD and VOLN are the two measures of the stock return volatility; FO is foreign ownership; Size is the firm size, which is calculated as the logarithms of the market value; LEV is leverage ratio, which is calculated by total liability divided by total asset; TR (Turnover) is the annual average number of shares traded divided by the number of shares outstanding in a day; DY is the dividend yield of listed firms; MTB is the market to book ratio, calculated as the stock price divided by the book value per share.; SD is standard deviation.

Table 3 Correlation coefficients amongst variables

	VOSD	VOLN	LFO	SFO	FO	DO	SIZE	LEV	TR	DY	MTB
VOSD	1										
VOLN	0.67	1									
LFO	-0.12	-0.12	1								
SFO	-0.06	-0.04	0.14	1							
FO	-0.12	-0.11	0.88	0.59	1						
DO	0.11	0.08	-0.83	-0.60	-0.96	1					
SIZE	-0.28	-0.02	0.13	0.21	0.21	-0.21	1				
LEV	-0.05	-0.03	0.04	-0.01	0.03	-0.02	-0.01	1			
TR	0.31	0.37	-0.09	-0.06	-0.10	0.09	0.08	0.02	1		
DY	-0.17	-0.11	-0.10	-0.06	-0.11	0.11	-0.23	-0.07	-0.17	1	
MTB	0.10	0.17	0.00	0.07	0.03	-0.04	0.27	0.00	0.17	-0.21	1

Notes: This table repots the correlation coefficients amongst variables. The sample is from 2007 to 2014. VOSD and VOLN are the two measures of the stock return volatility; FO is foreign ownership; LFO is large foreign ownership; SFO is small foreign ownership; DO is domestic ownership; Size is the firm size, which is calculated as the logarithms of the market value; LEV is leverage ratio, which is calculated by total liability divided by total asset; TR (Turnover) is the annual average number of shares traded divided by the number of shares outstanding in a day; DY is the dividend yield of listed firms; MTB is the market to book ratio, calculated as the stock price divided by the book value per share.

Table 4 T-test on the equality of means and non-parametric sample test

Variable	Difference in mean	Probability (Pr(T > t))	Difference in median	Probability (Pr(T > t))
VOSD	0.069***	0.0000	0.083***	0.0000
VOLN	0.102**	0.0380	0.163**	0.0180
Size	-1.521***	0.0000	-1.543***	0.0000
LEV	-0.468***	0.0045	-0.367***	0.005
TR	0.003	0.9760	-0.073	0.5760
DY	1.369***	0.0000	1.495***	0.0000
MTB	-0.140***	0.0032	-0.057***	0.0025

Notes: This table repots the T-test on the equality of means and non-parametric sample test. The sample is from 2007 to 2014. VOSD and VOLN are the two measures of the stock return volatility; FO is foreign ownership; LFO is large foreign ownership; SFO is small foreign ownership; DO is domestic ownership; Size is the firm size, which is calculated as the logarithms of the market value; LEV is leverage ratio, which is calculated by total liability divided by total asset; TR (Turnover) is the annual average number of shares traded divided by the number of shares outstanding in a day; DY is the dividend yield of listed firms; MTB is the market to book ratio, calculated as the stock price divided by the book value per share.. *** indicates significance at the 1% level; ** at the 5% level; * at the 10% level.

Table 5 Regression results where the dependent variables are VOSD and VOLN and independent variable is FO

Variable	OLS regression with clustered standard errors			
	VOSD (a)		VOLN (b)	
	Coeff.	p-value	Coeff.	p-value
FO	-0.0010**	0.0240	-0.0088**	0.0190
Size	0.02762***	0.0000	0.0845**	0.002
LEV	-0.0074***	0.0000	-0.0902***	0.000
TR	0.02285***	0.0000	0.1167***	0.0000
DY	-0.0059***	0.0000	-0.00529	0.4060
MTB	-0.0373***	0.0000	0.7026***	0.0000
R-Squared	0.1731		0.3414	
Standard error adjusted for 298 clusters in company				
Year fixed effects	YES		YES	
No. of obs	2076		2076	

Notes: This table repots regression results where the dependent variables are VOSD and VOLN and independent variable is FO. The sample is from 2007 to 2014. Panel (a) of the Table reports the regression results where the dependent variable is VOSD. Panel (b) of the Table reports the regression results where the dependent variable is VOLN. VOSD and VOLN are the two measures of the stock return volatility; FO is foreign ownership; Size is the firm size, which is calculated as the logarithms of the market value; LEV is leverage ratio, which is calculated by total liability divided by total asset; TR (Turnover) is the annual average number of shares traded divided by the number of shares outstanding in a day; DY is the dividend yield of listed firms; MTB is the market to book ratio, calculated as the stock price divided by the book value per share. *** indicates significance at the 1% level; ** at the 5% level; * at the 10% level.

Table 6 Regression results where the dependent variables are VOSD and VOLN and independent variable is LFO

Variable	OLS regression with clustered standard errors			
	VOSD		VOLN	
	Coeff.	p-value	Coeff.	p-value
LFO	-0.0008**	0.0260	-0.0130***	0.0020
Size	0.0283***	0.0000	0.0871***	0.0020
LEV	-0.00747***	0.0000	-0.0890***	0.0000
TR	0.0231***	0.0000	0.1162***	0.0000
DY	-0.0058***	0.0000	-0.0055**	0.0383
MTB	-0.0369***	0.0000	0.7025***	0.0000
R-Squared	0.1715		0.2454	
Standard error adjusted for 298 cluster in company				
Year fixed effects	YES		YES	
No. of obs	2076		2076	

Notes: This table repots regression results where the dependent variables are VOSD and VOLN and independent variable is large foreign ownership (LFO). The sample is from 2007 to 2014. VOSD and VOLN are the two measures of the stock return volatility; FO is foreign ownership; LFO is large foreign ownership; Size is the firm size, which is calculated as the logarithms of the market value; LEV is leverage ratio, which is calculated by total liability divided by total asset; TR (Turnover) is the annual average number of shares traded divided by the number of shares outstanding in a day; DY is the dividend yield of listed firms; MTB is the market to book ratio, calculated as the stock price divided by the book value per share. *** indicates significance at the 1% level; ** at the 5% level; * at the 10% level.

Table 7 Regression results where the dependent variables are VOSD and VOLN and independent variable is small foreign ownership (SFO)

Variable	OLS regression with clustered standard errors			
	VOSD		VOLN	
	Coeff.	p-value	Coeff.	p-value
SFO	-0.0019	0.2220	-0.002	0.9720
Size	-0.0277***	0.0000	-0.0953***	0.001
LEV	-0.0072***	0.0000	-0.0910***	0.0000
TR	0.0231***	0.0000	0.122***	0.0000
DY	-0.0058***	0.0000	-0.0037	0.555
MTB	-0.0370***	0.0000	0.7090***	0.0000
R-Squared	0.2405		0.1635	
Standard error adjusted for 298 cluster in company				
Year fixed effects	YES		YES	
No. of obs	2076		2076	

Notes: This table repots regression results where the dependent variables are VOSD and VOLN and independent variable is small foreign ownership (SFO). The sample is from 2007 to 2014. VOSD and VOLN are the two measures of the stock return volatility; FO is foreign ownership; SFO is small foreign ownership; Size is the firm size, which is calculated as the logarithms of the market value; LEV is leverage ratio, which is calculated by total liability divided by total equity; TR (Turnover) is the annual average number of shares traded divided by the number of shares outstanding in a day; DY is the dividend yield of listed firms; MTB is the market to book ratio, calculated as the stock price divided by the book value per share. *** indicates significance at the 1% level; ** at the 5% level; * at the 10% level.

Table 8 Regression results during the global financial crisis

Variable	OLS regression with clustered standard errors			
	VOSD		VOLN	
	Coeff.	p-value	Coeff.	p-value
FO	-0.0067*	0.0890	-0.2331***	0.0000
Size	0.0061***	0.0000	0.1778***	0.0021
LEV	0.0432***	0.0000	0.0830	0.7920
TR	0.0016**	0.0730	-0.1177***	0.0010
DY	-0.0012**	0.0440	0.0178	0.4040
MTB	-0.00365***	0.0000	0.3672***	0.0000
R-Squared	0.2654		0.5755	
Standard error adjusted for 223 cluster in company				
Year fixed effects	YES		YES	
No. of obs	446		446	

Notes: This table repots regression results during the global financial crisis. The sample is from 2007 to 2008. VOSD and VOLN are the two measures of the stock return volatility; FO is foreign ownership; Size is the firm size, which is calculated as the logarithms of the market value; LEV is leverage ratio, which is calculated by total liability divided by total equity; TR (Turnover) is the annual average number of shares traded divided by the number of shares outstanding in a day; DY is the dividend yield of listed firms; MTB is the market to book ratio, calculated as the stock price divided by the book value per share. *** indicates significance at the 1% level; ** at the 5% level; * at the 10% level.

Table 9 Fixed effects regression results where the dependent variables are VOSD and VOLN and independent variable is FO

Variable	Panel fixed effect			
	VOSD (a)		VOLN (b)	
	Coeff.	p-value	Coeff.	p-value
FO	-0.0008**	0.0457	-0.0074***	0.0000
Size	0.1150	0.2970	1.4648**	0.0150
LEV	-0.0009	0.6440	-0.0229	0.1010
TR	0.0235***	0.0000	0.1465***	0.0000
DY	-0.0040***	0.0000	-0.0038	0.3010
MTB	0.0608***	0.0000	0.3305***	0.0000
R-Squared	0.1372		0.0821	
F	57.29		64.18	
Prob > F	0.0000		0.0000	
Standard error adjusted for 298 cluster in company				
Company fixed effects	YES		YES	
Year fixed effects	YES		YES	
No. of obs	2076		2076	

Notes: This table repots fixed effects regression results where the dependent variables are VOSD and VOLN and independent variable is FO. The sample is from 2007 to 2014. VOSD and VOLN are the two measures of the stock return volatility; FO is foreign ownership; Size is the firm size, which is calculated as the logarithms of the market value; LEV is leverage ratio, which is calculated by total liability divided by total equity; TR (Turnover) is the annual average number of shares traded divided by the number of shares outstanding in a day; DY is the dividend yield of listed firms; MTB is the market to book ratio, calculated as the stock price divided by the book value per share. *** indicates significance at the 1% level; ** at the 5% level; * at the 10% level.

Table 10 IV regression model

Variable	First Stage (a) Foreign ownership		Second Stage (b) VOSD		VOLN	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
FO			-0.00174*	0.1	-0.0083***	0.01
Size	0.2177	0.194	-0.0267***	0	-0.039**	0.014
LEV	-0.0138	0.833	0.0074***	0	-0.0129***	0.001
TR	-0.5863***	0	0.0224***	0	0.188***	0
DY	-0.1730***	0	-0.0069***	0	-0.009**	0.017
MTB	-0.6260***	0	-0.0037***	0	0.155***	0
Original ultimate controlling owner	8.668***	0				
Pyramid-controlled layer	-0.4119***	0				
R-Squared	0.1748					
Standard error adjusted for 298 cluster in company						
Year fixed effects	YES		YES		YES	
No. of obs	2076		2076		2076	

Notes: This table repots IV regression model results where original ultimate controlling owner and Pyramid-controlled layer are instrumental variables. The sample is from 2007 to 2014. First stage of IV regression model is shown in panel (a). Second stage of IV regression model is shown in panel (b) VOSD and VOLN are the two measures of the stock return volatility; FO is foreign ownership; Size is the firm size, which is calculated as the logarithms of the market value; LEV is leverage ratio, which is calculated by total liability divided by total equity; TR (Turnover) is the annual average number of shares traded divided by the number of shares outstanding in a day; DY is the dividend yield of listed firms; MTB is the market to book ratio, calculated as the stock price divided by the book value per share. *** indicates significance at the 1% level; ** at the 5% level; * at the 10% level.

Table 11 First difference regression model

Variable	First difference regression model			
	VOSD		VOLN	
	Coeff.	p-value	Coeff.	p-value
FO	-0.0013**	0.0110	-0.0117***	0.0010
Size	0.0028	0.7560	0.3641***	0.0000
LEV	0.0240***	0.0000	-0.1615***	0.0000
TR	0.0247***	0.0000	0.0283	0.1490
DY	-0.0057***	0.0000	-0.0021	0.7130
MTB	-0.0377***	0.0000	0.7838***	0.0000
R-Squared	0.1102		0.0159	
Standard error adjusted for 298 cluster in company				
Company fixed effects	YES		YES	
Year fixed effects	YES		YES	
No. of obs	2076		2076	

Notes: This table repots first difference regression model. The sample is from 2007 to 2014. VOSD and VOLN are the two measures of the stock return volatility; FO is foreign ownership; Size is the firm size, which is calculated as the logarithms of the market value; LEV is leverage ratio, which is calculated by total liability divided by total equity; TR (Turnover) is the annual average number of shares traded divided by the number of shares outstanding in a day; DY is the dividend yield of listed firms; MTB is the market to book ratio, calculated as the stock price divided by the book value per share. *** indicates significance at the 1% level; ** at the 5% level; * at the 10% level.